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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,842	03/04/2004	Juncheng Xu	3811-008-27	3856

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Supervisor, Patent Prosecution Services
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1200 Nineteenth Street, N.W.
Washington, DC 20036-2412

EXAMINER

TURNER, SAMUEL A

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/791,842	Applicant(s) XU ET AL.	
	Examiner Samuel A. Turner	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-46 is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/23/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings are objected to because the drawings are informal with handwritten numerals and poor shading. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application.

Replacement Drawing Sheets

Drawing changes must be made by presenting replacement sheets which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments section, or remarks, section of the amendment paper. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). A replacement sheet must include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and within the top margin.

Annotated Drawing Sheets

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheet(s) must be clearly labeled as "Annotated Sheet" and must be presented in the amendment or remarks section that explains the change(s) to the drawings.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

Claim Objections

Claim 30 is objected to because of the following informalities: "withing" should be --within--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 25 there is no antecedent basis for "the spacer".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2877

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 10, 14, and 25 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Balachandran et al(6,901,176).

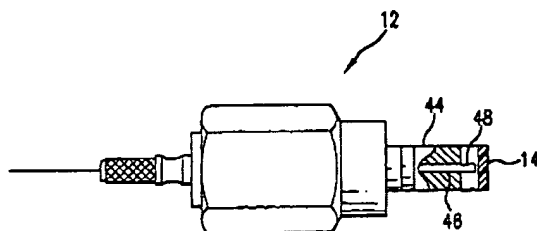


FIG.4

With regard to claim 1, Balachandran et al teach a sensor comprising:

a ferrule, the ferrule having a bore formed therein, the ferrule having a face, the face having a pit formed therein, the pit having a wider diameter than a diameter of the bore, the bore intersecting the pit(44);

a diaphragm attached to the ferrule such that it extends over the pit, the diaphragm having an inside reflecting surface facing the pit(14); and

a fiber disposed within the bore, an end of the optical fiber and the inside reflecting surface of the diaphragm being spaced apart to form a Fabry-Perot cavity(46).

As to claim 10, wherein the diaphragm is disc-shaped and has a circumference approximately equal to the circumferences of the ferrule(14).

With regard to claim 14, Balachandran et al teach a method for forming a sensor comprising the steps of:

forming a pit in a face of a ferrule, the ferrule having a bore formed therein, the pit being formed such that it intersects the bore(44);

attaching a diaphragm to the ferrule such that it extends over the pit, the diaphragm having an inside reflecting surface facing the pit(14);

disposing a fiber within the bore(46); and

attaching the fiber to the ferrule, an end of the optical fiber and the inside reflecting surface of the diaphragm being spaced apart to form a Fabry-Perot cavity(see figure 4; column 9, lines27-34).

As to claim 25, wherein the diaphragm is disc-shaped and has a circumference approximately equal to the circumferences of the ferrule(14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6-9, 11-13, 19-24, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balachandran et al(6,901,176).

Balachandran et al is silent on the material used to connect the fiber to the ferrule, the ferrule material, or how the ferrule pit is formed.

Official notice is taken that; solder glass, spin-on-glass, sol-gel, and glass sealant are well known means for attaching optical fibers; glass, silica, and crystal materials such as sapphire are well known materials in fiber sensors; and etching and machining are well known micro-manufacturing methods in fiber sensor manufacture. See In re Malcom, 1942 C.D 589; 543 O.G. 440.

If applicant does not traverse the examiner's assertion of official notice or applicant's traverse is not adequate, the next Office action will indicate that the common knowledge or well-known in the art statement is taken to be admitted prior art because applicant either failed to traverse the examiner's assertion of official notice or that the traverse was inadequate.

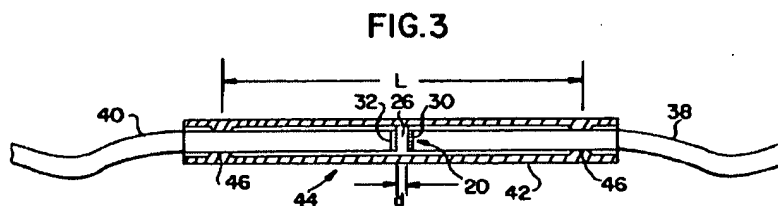
With regard to claims 6-9, and 21-24, it would have been obvious to one of ordinary skill in the art at the time the invention was made to attach the fiber to the ferrule in order to secure the fiber position. The use of solder glass, spin-on-

glass, sol-gel, or glass sealant would have been obvious attaching materials in order to match the coefficients of thermal expansion to the fiber and ferrule.

With regard to claims 11-13, and 26-28, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Balachandran ferrule by constructing it out of either glass, silica, or crystal materials such as sapphire in order to match the ferrule material to the sensor environment.

With regard to claims 19 and 20, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the ferrule pit by any means including machining, etching, casting, deposition, or any other known manufacturing method.

Claims 2-4, 15-17, and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balachandran et al(6,901,176) as applied to claims 6-9, 11-13, 19-24, and 26-28 above, and further in view of Belleville et al(5,202,939).



Balachandran et al teach a method for forming a diaphragm sensor comprising the steps of:

attaching a diaphragm to a ferrule, the ferrule having an end, the ferrule having a bore formed therein, the diaphragm having an inside reflecting surface facing the end of the ferrule(14);

disposing an optical fiber within the bore, the optical fiber having an end, the end being spaced apart from the inside reflecting surface of the diaphragm, the end of the optical fiber and the inside reflecting surface of the diaphragm forming a Fabry-Perot cavity(46). However, Balachandran et al fail to teach the specific means by which the sensor elements are connected.

Belleville et al teach that elements in a Fabry-Perot fiber sensor can be connected(46) by welding using either a CO2 laser or electric arc(column 6, lines 17-21).

With regard to claims 2-4, 15-17, and 29-32; it would have been obvious to one of ordinary skill in the art at the time the invention was made connect the fiber and/or diaphragm to the ferrule because the use of a laser allows the precise control of the manufacturing process to obtain reproducible results(column 6, lines 17-21).

Claims 5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balachandran et al(6,901,176) as applied to claims 6-9, 11-13, 19-24, and 26-28 above, and further in view of Wilson(5,844,236).

While Balachandran et al fail to teach a vacuum in the Fabry Perot cavity, Wilson teaches That fiber sensors with a cavity vacuum ensures a high Q value for the sensor(column 1, lines 46-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the Balachandran Fabry Perot cavity with a vacuum in order to have a high Q value for the cavity.

Double Patenting

For the below Obvious Double Patenting rejections, it is assumed that the applications were commonly owned at the time of invention. It is noted however that no statement that the applications were commonly owned at the time of invention.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 10, 14 and 26 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 30 and 36 of copending Application No. 10/791,841. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the instant application are anticipated by the claims of the 10/791,841 application.

With regard to claim 1, claim 30 of application 10/791,841 claims a sensor comprising(line 1):

a ferrule, the ferrule having a bore formed therein, the ferrule having a face, the face having a pit formed therein, the pit having a wider diameter than a diameter of the bore, the bore intersecting the pit(lines 2-5);

a diaphragm attached to the ferrule such that it extends over the pit, the diaphragm having an inside reflecting surface facing the pit(lines 6-7); and

a fiber disposed within the bore, an end of the optical fiber and the inside reflecting surface of the diaphragm being spaced apart to form a Fabry-Perot cavity(lines 8-10).

As to claim 11, claim 30 of application 10/791,841 further claims wherein the ferrule comprises a crystal material(line 2).

With regard to claim 14, claim 36 of application 10/791,841 claims a method for forming a sensor comprising the steps of(line 1):

forming a pit in a face of a ferrule, the ferrule having a bore formed therein, the pit being formed such that it intersects the bore(lines 2-4);

attaching a diaphragm to the ferrule such that it extends over the pit, the diaphragm having an inside reflecting surface facing the pit(lines 5-6);

disposing a fiber within the bore(line 7); and

attaching the fiber to the ferrule, an end of the optical fiber and the inside reflecting surface of the diaphragm being spaced apart to form a Fabry-Perot cavity(lines 8-10).

As to claim 11, claim 30 of application 10/791,841 further claims wherein the ferrule comprises a crystal material(line 3).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 12, 13, 26, and 27 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 30 and 36 of copending Application No. 10/791,841.

With regard to claim 12, 13, 26, and 27; claims 30 and 36 of application 10/791,841 fails to claim glass or silica as the ferrule material. Official notice is taken that glass, silica, and crystal materials such as sapphire are well known materials in fiber sensors. See In re Malcom, 1942 C.D 589; 543 O.G. 440.

It would have been obvious to one of ordinary skill in the art at the time the invention was made replace the claimed single crystal material of the 10/791,841 application with either a glass or silica material in order to reduce the cost of the ferrule in environments where the temperature is less than 2000° degrees.

This is a provisional obviousness-type double patenting rejection.

Claims 1, 11-13, 14, and 26-28 are directed to an invention not patentably distinct from claims 30 and 36 of commonly assigned 10/791,841. Specifically, see the above provisional double patenting rejections.

The U.S. Patent and Trademark Office normally will not institute an interference between applications or a patent and an application of common ownership (see MPEP § 2302). Commonly assigned 10/791,841, discussed above, would form the basis for a rejection of the noted claims under 35 U.S.C. 103(a) if the commonly assigned case qualifies as prior art under 35 U.S.C. 102(e), (f) or (g) and the conflicting inventions were not commonly owned at the time the invention in this application was made. In order for the examiner to resolve this issue, the assignee can, under 35 U.S.C. 103(c) and 37 CFR 1.78(c), either show that the conflicting inventions were commonly owned at the time the invention in this application was made, or name the prior inventor of the conflicting subject matter.

A showing that the inventions were commonly owned at the time the invention in this application was made will preclude a rejection under 35 U.S.C. 103(a) based upon the commonly assigned case as a reference under 35 U.S.C. 102(f) or (g), or 35 U.S.C. 102(e) for applications pending on or after December 10, 2004.

Allowable Subject Matter

Claims 33-46 are allowed in view of the prior art of record.

With regard to claim 33, the prior art of record fails to teach the second fiber placed between the first fiber and the diaphragm, as claimed, and where the

coefficient of thermal expansion of the second fiber is selected to compensate for a difference between the coefficients of thermal expansion of the first fiber and the ferrule.

With regard to claim 37, the prior art of record fails to teach the second fiber placed between the first fiber and the diaphragm, as claimed, and where the coefficient of thermal expansion of the second fiber is selected to compensate for deflection of the diaphragm caused by expansion of air in the recess as the sensor is heated.

With regard to claim 41, the prior art of record fails to teach welding the ferrule to the fiber with a laser where at least one parameter of the laser is controlled so the distance between the fiber and diaphragm changes from the first distance to the desired distance during the welding.

Relevant Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Stone et al(4,861,136), Andrews(5,359,405), Murphy et al(5,381,229), Taylor et al(5,452,087), Sawatari et al(5,870,511), Sherrer et al(6,738,145), and Lenzing et al(6,820,488) are cited because they teach various optical materials, means for attaching, and sensor configurations.

Art Unit: 2877

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose phone number is 571-272-2432.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached on 571-272-2800 ext. 77.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. A. Turner', with a stylized flourish extending to the right.

Samuel A. Turner
Primary Examiner
Art Unit 2877